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Journal of the Society of Arts.

FRIDAY, JULY 5, 1861.

INTERNATIONAL EXHIBITION OF 1862.

The Council beg to announce that the Guarantee Deed is now lying at the Society's House for signature, and they will be much obliged if those gentlemen who have given in their names as Guarantors, will make it convenient to call there and attach their signatures to the Document. Signatures for sums amounting in the aggregate to £422,800, have been attached to the Deed.

GUARANTEE FUND FOR THE EXHIBITION OF 1862.

The following additions have been made since the announcement in the *Journal* for June 14 :—

*** *The names marked with an asterisk are those of Members of the Society of Arts.*

NAMES.	AMOUNT.	REPRESENTING THE OBJECTS OF THE SOCIETY—ARTS, MANUFACTURES, AND COMMERCE.
*George Lowe, F.R.S., 39, Finsbury-circus, E.C.	£200	Arts.
F. R. de la Trehonnais, Oak-villa, Norwood, S.	100	Arts.
*William Baker, 30, Cranbourn-street, W.C.	100	Commerce.
*Richard Greaves, The Cliff, Warwick	100	Arts.
Horace St. John, Hope House, Norwood, S.	100	Arts.
*Joseph Goff, jun., 25, Grosvenor-place, S.W.	100	Arts.
Richard Birley, Seedley, Pendleton, Manchester	500	Commerce.
Samuel H. Thompson, Thingwall, Liverpool	500	Commerce.
W. N. Hodgson, Newby Grange, Carlisle	250	Arts.
Lt.-Col. H. D. Maclean, Lazonby Hall, Penrith	250	Arts.
Richard Moon, Bevere, near Worcester	250	Arts.
Charles E. Stewart, 30, Upper Harley-street, W.	250	Commerce.
H. Wollaston Blake, 8, Devonshire-place, W.	100	Commerce.
W. S. Marshall, 20, Strand, W.C.	1,000	Commerce.
John Girdwood, 49, Pall-mall, S.W.	100	Arts.
*Thomas Hilton, Great Suffolk-street, Southwark, S.	100	Commerce.
*Seymour Teulon, Tenchley's-park, Limpsfield, Surrey	100	Arts.
Charles Woolloton, 246, High-street, Borough, S.	500	Commerce.

By Order, P. LE NEVE FOSTER, *Secretary.*

INTERNATIONAL EXHIBITION OF 1862.

Her Majesty's Commissioners have appointed the following Committees, in addition to those already published in the *Journal* :—

For Class 2 (Chemical Substances and Products), W. T. Brande, Esq., F.R.S.; Warren de la Rue, Esq., F.R.S.; Professor Faraday, F.R.S.; Thomas Graham, Esq., F.R.S.; A. W. Hofmann, Esq., LL.D., F.R.S.; W. A. Miller, Esq., M.D. F.R.S.; Dr. Lyon Playfair, C.B., F.R.S.; Theo. Redwood, Esq., Ph.D.; J. Stenhouse, Esq., LL.D., F.R.S.

For Sanitary Appliances, in connection with Class 10 (Civil Engineering, Architectural Machines, and Building Contrivances), the Earl of Shaftesbury; Viscount Ebrington; the Right Rev. the Lord Bishop of Bath and Wells; the Right Hon. the Lord Mayor; Sir Morton Peto, Bart., M.P.; John Campbell, Esq.; E. Chadwick, Esq., C.B.; W. Fairbairn, Esq., LL.D., F.R.S.; Captain D. Galton, R.E.; G. Godwin, Esq., F.R.S., F.S.A.; Philip Holland, Esq.; Owen Jones, Esq.; Dr. Letheby; J. Simon, Esq., F.R.S.; R. Rawlinson, Esq., C.E.; A. Strutt, Esq.; Dr. Sutherland, F.R.S.; T. Twining, jun., Esq.

The following Local Committees have been formed, in addition to those already published :—

DUMFRIES.

James Gordon, Esq. (Provost), *Chairman.*

W. R. M'Diarmid, Esq. (of the *Dumfries and Galloway Courier*), *Vice-Chairman.*

Wm. Martin, Esq. (Town Clerk), *Hon. Secretary.*

LEAMINGTON.

Messrs. Bowen and Stanley (of the Local Board of Health), to act as a Local Committee.

LEICESTER.

Joseph Whetstone, Esq., *Chairman.*
John D. Harris, Esq., *Vice-Chairman.*
J. A. Wykes, Esq., *Secretary.*

Meetings of the Metropolitan Exhibitors have taken place, and Class Committees for the Metropolis, in addition to those already published, have been appointed as follows :—

Class 2 (Chemical Substances, &c.)

Sub-class A (Exhibitors of Chemical Products): Messrs. Henry Cox, Heywood, and Samuel Lloyd Howard.

Sub-class B (Exhibitors of Medical and Pharmaceutical Processes): Messrs. Bastick, C. Davy, Daniel Hanbury, and S. Piesse.

Class 13 (Philosophical Instruments, &c.): Messrs. Elliott, F. H. Holmes, W. Ladd, H. Lealand, W. Simms, B. Stewart, and C. Varley.

Class 21 (Woollen and Worsted, &c.): Messrs. Beecham, J. P. Bull, F. Scott, H. S. Way, and J. West.

Class 22 (Carpets): Messrs. Baber, H. Lapworth, T. Smith, Tapling, and Edgar Waugh.

Class 25 (Skins, Fur, Feathers, and Hair): Sub-Class A., Messrs. Drake, Ince, Jeffs, Poland, and Mr. Bevington, *Chairman.*

Sub-Class B. (Feathers): Messrs. Barrett, Child, Farrant, Hovenden, Truefitt, Winter, and Mr. Nightingale, *Chairman.* [This Committee acts for Sub-Classes B. and C. conjointly.]

Class 27 (Articles of Clothing).

Sub-class A (Hats and Caps): Messrs. Ellwood, Tress, and C. Gaimes, *Chairman.*

Sub-class C (Hosiery, Gloves, and Clothing in general):

Messrs. Blyth, Foster, Fownes, Harborough, Meyers, Salomons, and Thompson.

Sub-class D (Boots and Shoes): Messrs. Atloff, Bowley, Dutton, Gordon, Hook, Humby, Medwin, Norman, and Peel.

Class 35 (Pottery): Messrs. J. Battam, Alderman Copeland, A. R. Daniell, H. Doulton, and W. J. Goode, Jun.

The following is the translation of a letter, addressed to Lord Granville, and received by Her Majesty's Commissioners :—

Berlin, 18th June, 1861.

My Lord,—I have the honour to acquaint your Lordship that I have undertaken the direction of a Commission, appointed to represent the interests of Prussian manufacturers at the Universal Exhibition of Art and Industry, to be held in London in the spring of next year, and to enter into correspondence with the Commissioners of her Majesty the Queen.

The idea of affording to the nations another opportunity of showing their industrial progress, seems to me very happy and opportune; and I conceive that there is every cause for gratitude to those who first conceived it, and have taken upon themselves the labour of carrying it into execution. The modifications of tariffs among European nations, which have lately been made, or may shortly be expected—modifications most important to trade, and the promotion of which confers the greatest honour upon Great Britain and her enlightened statesmen—will, no doubt, have great influence upon the exchange of goods, and materially add to the range of commerce. Under these circumstances, the Exhibition will assume the character of a great fair, calculated to create new commercial relations and to extend those that exist. Hence, apart from the advantage of instruction, it will afford considerable substantive advantages to those who take part in it, and will, doubtless on this account, find all men eager to participate. I am convinced that the Prussian manufacturers will appreciate the importance of the undertaking.

I beg to transmit to your lordship herewith the first document addressed by the Prussian Commission to the Commissioners for the Exhibition; and I avail myself of this opportunity to recommend it, and those which will follow it, to your favourable consideration and attention.

With especial esteem,

(Signed) FREDERIC WILLIAM,
Crown Prince of Prussia.

The following Foreign Commissions have been appointed, in addition to those already published:

Denmark Proper and Slesvig.

Professor Hummell, Technical Counsellor of the Ministry of the Interior; Mr. Thiele, Secretary of the Royal Academy of Fine Arts; Mr. Schwartz, jun., President of the Society of Arts and Industry.

Holstein and Lauenburg.

Professor Dr. Karsten; Mr. C. Jaspersen, manufacturer; Mr. F. A. Flach, President of the Agricultural Society; Mr. G. Martens, Architect.

Mr. A. Westenholz, 26, Mark-lane, City, will act as Agent and Commissioner for the two Commissions, through whom all communications are to be addressed.

THE MANSFELD COPPER-SLATE MINES IN PRUSSIAN SAXONY: THEIR PAST AND PRESENT STATE; WITH STATISTICS: METALLURGICAL PROCESSES, ADMINISTRATION, SOCIAL CONDITION OF THE MINERS, BENEVOLENT FUND.

By W. P. Jervis, F.G.S., Mining Engineer.

From whatever point of view we choose to regard them, the Mansfeld mines must decidedly rank among the most interesting in the world. Whether we look at the enormous amount of matter annually raised from the bowels of the earth, greater than that from any copper mine in this country, or the exceeding poverty of the ores, which would at first sight appear to be useless; the apparent anomaly that every ton of refined copper as it leaves the works has actually cost more than an equal weight of metal could be purchased for on the spot from the merchant, or the magnificent and simple process lately devised by a chemist of no low standing, by which a quantity of silver in it, scarcely perceptible on a small scale by the finest analysis, is made to yield the most dazzling results; whether we examine the beautiful arrangement of the Royal Mining Office in Eisleben, or study the economical working of the several departments of the company's administration; whether we expatiate upon the splendid success attendant on keeping elaborate and costly statistics, or look to the beneficial effects of having the officials scientifically and practically trained in a mining school; lastly, whether, diving more deeply into its social consequences, we admire the wisdom by which the miners are supplied with the staff of life at a fixed price, and provided with benevolent funds, pensions, &c., or carrying our eyes back for three centuries, pay a tribute of respect to the memory of the great man who may be said to have given the first impetus to these mines, long worked by a downtrodden people; however examined, the Mansfeld mines seem to deserve far more attention than has hitherto been bestowed on them. The wish of the writer is two-fold, not only to give a pleasant description to amuse, or an historical account to record past success, but to draw inferences whereby to improve the mode of working mines elsewhere; nor will he consider his task accomplished unless the same benevolent institutions long developed to such advantage in one place be brought to bear on the British mining population, for, although it would be untrue to say that the public are ignorant of what is going on elsewhere in foreign lands, a humble instrument may be often employed in a quiet manner to bring forward the most excellent improvements long in vigour among our continental brethren.

Starting from the railway station at Halle, in Prussian Saxony, after a pleasant ride of four hours in the royal mail diligence, a blast or two from the all but musical horn of the coachman announces to us that we are approaching the celebrated hotel known as the Goldene Schiff. A lively scene ensues as we alight, what with the transfer of passengers and letter-bags and the arrival of branch conveyances which perform the local service. It is just one o'clock, and we are introduced to the *table-d'hôte* by the intelligent and hospitable proprietor of the Schiffchen. Should this be our first visit to Germany we should be struck with the openness and friendly behaviour of our neighbours, upon whom we might be tempted to pass a few quiet remarks. After a short stay at the table all uncertainty would be at an end as to the pursuits of our numerous fellow diners, most of whom resort to this convivial board during their residence in the town. The countenances of our new friends bear testimony to their freedom from care about the morrow; their open features and courteous conduct, coupled with their unrestrained conversation, announce them to be engaged in some honourable and lucrative profession; a certain community of sentiment and great friendliness prevail among them, so that we are led to the belief that they belong to the same walk of life. We will now follow one of the party through the town of Eisleben, for the good old habit of mid-day dinners permits the officials of every rank, leaving their desks, to enjoy a breath of air and repair for an hour to their family circles, or spend their time at the *table-d'hôte*, thereby breaking much of the monotony of an employment often execrated in other countries by young men of spirit.

Since Eisleben is a small town of only 13,000 inhabitants, it will be a matter of some surprise to see the bustling scene on every side. The market place is gay, and filled with booths, where the honest people are tempting the passer by to purchase clothing, hardware, household articles, and other commodities of life as well as food.

Through the throng of townspeople wind in every direction a regiment of young men, whose athletic proportions, intelligent and open countenances, and smart costume are sure to command immediate attention. Dressed as they are in a short black tunic, with something on their caps resembling a death's head and crossed bones, they might at a little distance suggest the idea of the celebrated black Brunswickers. Closer inspection reveals their peaceable appearance. Nothing gaudy about their attire, though not a speck of dust on their neat and trim tunic, which is embroidered on the shoulders with a kind of epaulet of black cord faced with velvet, and the body plaited somewhat in the manner of a shepherd's frock, and rather profusely covered with brass or horn buttons; behind their backs their belt expands into a semicircular leathern apron, upon which they can sit at pleasure, but the use of which is still rather enigmatical. The device they all wear on a black cloth cap, with a narrow red band of the same material (two hammers crossing each other, and surmounted by a crown), at once solves all doubt as to what the employment of these youths may be. They are in fact the Mansfeld miners, who, to the number of about 1,000, are come into Eisleben to receive their months' wages. They congregate before a fine old building, above the portal of which are inscribed in ancient German characters, the words *Gewerken Haus* (Offices of the Company). The pay-day is known all through the neighbourhood as the *Lohntag*, and is looked forward to with as keen interest by the tradesmen as by the miners, for the former generally retain a tithe of the money before it has time to leave the town.

A story is told of an English gentleman, who in the good old times, planned a trip to Paris, without having any acquaintance with the language of the country; with laudable curiosity he sought information regarding all he saw, but to every demand the polite Frenchmen replied. *Monsieur, je ne vous comprends pas.* In a brief space of time our traveller felt convinced that Mons. Je-ne-vous-comprends-pas must be the greatest man in the capital, since everything belonged to him, from the palace to the hovel, and his name was in every man's mouth. More true might it have been had he strayed to Eisleben and taken a drive in the vicinity. Had he asked to whom belonged that public building, foundry, smelting-house, steam-engine? that heap of stones or mass of metal? the employment of such a gentleman, clerk, labourer? whose were the copper, silver, and coal mines, the mills, roads, tolls—even the forests with all the noble game they contained? One answer would have been given to all these questions and a thousand similar ones, they are all *gewerkschaftlich* (belonging to the company); in other words the Mansfeld Mining Company is the life and soul of the town and neighbourhood, the source of riches for all classes, to whom it gives steady occupation, so that it would not be far from the mark to say that 60,000 persons live more or less directly, if not wholly, at least principally, on the Mansfeld mines.

The practical value of the Mansfeld mines by no means depends on the richness of the ore, and the quantity annually raised would not be sufficient argument in its favour; the secret lies in the exceptional geological disposition of the ore; it will, therefore, be well to give a rapid *reconnaissance* of the country.

Metalliferous minerals are found under several distinct and incompatible forms, which do not in any manner interfere with each other, and may thus be classified into three principal groups. The veins may be intimately connected with igneous eruptions of various ages and kinds, such as are prevalent in Jamaica, Tuscany, and Piedmont, now enclosed in serpentine or accompanying greenstone and other rocks. This class is just represented in Britain by the copper of the Lizard district in Cornwall, as well as by the copper mines of Anglesea, and are the least understood, the phenomena which attend the occurrence of the ore being so occult that the laws by which they are governed have still to be worked out; consequently, though sometimes highly remunerative, they are at best somewhat speculative.

Then we have the world-wide distributed and far more important class of ordinary metalliferous veins, styled "lodes" by miners where containing ores; of such, for instance are copper, lead, zinc, and tin mines. These veins are generally met with at the junction of two different rocks, in most cases one or both of which have been at least altered by the action of heat, and would receive from some the name of metamorphosed; or they may fill cracks and crevices, dependent on the cooling of neighbouring molten rock, which has very considerably contracted in the act, leaving large fissures more or less parallel to the plane of contact between itself and the pre-existing rocks; these appear to bear an intimate relation to the magnetic pole, whence the more or less perfect degree of parallelism in groups of veins, of the same age, in a given district. As is well-known, such veins rarely reach the surface, and as the heat and intensity of the igneous action were necessarily greatest at a considerable depth, so are the fissures wider, and the ore richer, and in greater quantity, whence the immense depth of many mines, and the strong temptation to proceed still further from the increasing per centage of metal, despite the highly augmented expense of pumping and raising, which could only be justified by the best returns.

The third and last primary class are deposits more or less stratified; coal seams are the type, with the clay-iron ores of the coal measures. Peroxide and carbonate of iron are largely distributed in England, Belgium, and France, parallel to the strata of Palæozoic rocks. Gold is usually met with in a less regular manner in alluvial deposits, having been washed out from distant quartz veins, and is, therefore, only scattered in minute quantities through a mass of useless material. As for copper, the most perfect, and perhaps the sole example of this class, is noticed in the *Kupferschiefer*, or copper-slate of North Germany, and especially of Mansfeld, where the regularity of the bed is in no way inferior over a wide tract of country to that of the best coal seam. This bed (there is only one) lies in general at a very slight angle, varying from horizontality to 20° or 25°; true, in confined localities it is tilted up to 40° or 45°, but in such instances only at the extremity of the formation.

The Hartz Mountains rise somewhat abruptly from the plain which girds them on the E. N. and W.; thus the Brocken, the culminating point, stands out in bold relief, and is visible from a distance in the territories of Hanover, Brunswick, and Prussia, as also on the opposite side from the Thuringian Principalities. The Brocken, rising to the height of 3,940 feet, is the most elevated point in North Germany, and consists chiefly of masses of granite, a rock repeated near Aschersleben, and on a miniature scale on the Kyffhaüser. Around these are porphyry eruptions and numerous metamorphous rocks, among which may be mentioned quartzite, and highly crystalline quartzose rocks, including *Grauwacke*, or clay-slate; these are often excessively hard, and contain the magnificent veins of copper and silver for which the Hartz has for ages been justly celebrated. As a general rule these Palæozoic rocks are so much altered that it is almost impossible to find any organic remains in them; they are much upheaved and excessively convulsed.

Next comes the Permian, a well-developed formation, lying unconformably on the older strata, so as to thin out in approaching Clausthal, until finally lost. In the neighbourhood of Eisleben, and on the Kyffhaüser, the lower part of the Permian rocks consists of several hundred feet of sandstones; the first beds are seldom visible, but close to Mansfeld a natural section reveals its super-position on the *Grauwacke* shales. The prevailing colour of the sandstone is red; it was long considered not to contain any ore, this—with the relation which we shall presently find it to bear to the copper slate—has caused it to acquire the name of *Roth Todtliegendes.* The lithological characteristics are excessively varied; thus, at times it is a dense fine-grained sandstone, the quartzose particles of which are firmly united together by a ferruginous cement. Other beds are coarser; here and there large rolled pebbles of more ancient rock lie disseminated through the mass; when these augment in quantity it assumes the character of a coarse conglomerate, the elements of which are of very various origin. Thus, in most of the beds, the predominant mineral is quartz, others contain *Kiesel Schiefer* (a silicious rock, much resembling Lydian stone), micaceous and chloritic fragments of a more laminated nature, and even, though rarely, pieces of dark limestone. From the great amount of attrition to which all these minerals have been subjected, they are almost invariably rounded, having probably formed the beach of an ancient Hartz island. I saw one or two specimens of quartz crystals from this rock in the mining school at Mansfeld, though they are great rarities. It would appear that during a portion at least of the Permian period the expanse of waters became restricted into the form of a lake—gigantic trees are found imbedded in the sandstone, often attaining two or two-and-a-half feet in diameter; they are entirely silicified and impregnated with peroxide of iron, which has rendered them so hard that when the adjacent rock has been worn away by atmospheric influences, blocks of silicified wood are carried down into the valleys, where they lie strewn in confusion over the Tertiary detritus and in the ploughed fields. The *Liegendes* occurs on the south of the Hartz, and stretches below Stollberg to Sangerhausen, Mansfeld, Hettstädt, and nearly to Halle; plunging southward of this whole extent to a great depth below the sea level, it re-appears on the very summit of the Kyffhaüser Mountains; again dipping south-west it disappears a second time in the valley near Frankenhausen to come to the surface in the vicinity of Eisenach, and around the Thuringian Forest.

Certain beds of the *Roth Liegendes* are of a deep purple and highly micaceous character, so that they pass into argillaceous schists, a fact best recognised after rains, when the surface becomes covered with tenacious clay soiling the fingers, whereas the sandstone district is pretty free from pools of water, and the ground speedily dries up. The two best sections of the Permian sandstones with which I am acquainted are on the Wipper, above Leimbach, a village about half a mile from Mansfeld, and between the Kyffhaüser and Rothenburg ruins, in the neighbourhood of Frankenhausen.

The *Roth Liegendes* is immediately followed by a very constant bed, not exceeding a few feet in thickness, in many places as many inches, generally free from oxide of iron—whence its white or pale-gray tint; in structure it presents great diversity; as a rule it is a compact, fine-grained, exceedingly hard sandstone, locally termed *Weiss Liegendes*—this demands our attention from its relations to the copper deposits.

Our object in dwelling so lengthily on these rocks will now become evident, for the *Weiss Liegendes* is the floor on which the *Kupferschiefer* strata invariably lie with perfect conformity for many a league. The *Kupferschiefer*, or copper slate, consists of a succession of very thin beds, from two to three feet in thickness, presenting the utmost variety of character, either dark brown schists, soft enough to be cut with a knife, or jet black slate of the greatest hardness, though never sufficiently homogeneous to be of the least economic use as a stone. Some part assumes precisely the appearance of fat caking coal, other resembling the the Belgian *terrehouille*. Other portions again are laminated, and finely streaked with white parallel lines, like little hairs, or even the edges of alternate sheets of black and white paper. Above these argillaceous beds are others, also highly bituminous, but containing a large proportion of carbonate of lime; the uppermost part is, indeed, nothing but an impure limestone. Few genera of organic remains have been noticed in the copper slate; such as exist indicate a tranquil sea, in which little ganoid fish sported in considerable abundance. It seems scarcely probable that there should have been only the two or three genera yet known. The largest fish is the *Platysomus*; the most ordinary the *Palæoniscum Freislebense*, and then other species of *Palæoniscum*; this is a creature somewhat of the form and size of a herring, completely armed with a coat of mail, the little black scales delicately sculptured, the designs being specific distinctions. It occasionally happens that a thin covering of copper pyrites has coated the scales, which gives the animal a magnificent appearance. I saw one specimen of *Palæoniscum* at Eisleben, in which the scales were coated with a deposit of native silver, as perfect as though it had been intentionally executed by a skilful chemist, and, as may be imagined, of surprising beauty. In addition to these fish, plant remains are from time to time brought to light, though seldom in a good state of preservation. In a few instances the carbonaceous particles still remain, so that the most delicate forms are distinguishable by means of the shining surface. These, no doubt, formed the food of the fish.

Above the copper slate, and still Permian, appears the *Zechstein* formation, consisting first of 15 to 20 feet of bituminous bedded limestone, dark slate-blue, approaching to black, and almost free from organic remains. It breaks into masses when blasted with gunpowder, and is considerably harder than the superincumbent gypsum. The transition from the one to the other of these portions of the *Zechstein* formation is abrupt, as the first inch of gypsum is colourless. The gypsum strata, being several hundred feet thick, constitute a striking feature in the landscape. The most important practical point relating to this rock is its exceeding softness and porosity; were it not for the latter fact it would be a far easier matter to work the mines, but where shafts pass through it they present a sort of shower-bath. In the midst of the mass of gypsum are several beds of cellular limestone, full of amorphous cavities, probably due to the unequal dissolving power of water on the constituent carbonates of dolomite; this is the *Rauchkalk*; other thin beds have such a decidedly fœtid odour when struck as to have obtained the name of *Stinkkalk*—this breaks into slabs; thus each kind of limestone is characterised by different physical properties. The gypsum lying below the beds of limestone is locally distinguished as *älter Gyps* (older gypsum) in contradistinction to the *jünger Gyps*, or that which lies above them. In places, the *Rauchkalk* is accompanied by a fine umber or fawn-coloured powder, likewise bituminous, and termed, though improperly, ashes (*Asche*). Here and there the gypsum is beautifully veined with black markings, similar to the inferior kinds of impure alabaster from Tuscany. The variegation of this *Bandgyps* owes its origin to the presence of the *Asche* in streaks and veins, but consolidated, whereas in the former case it is quite loose, and may be fashioned in the hand like clay, and by baking indurates considerably so as to resemble brown brick. No high temperature is needed to give consistency to the "ashes;" indeed, the country people are accustomed to moisten it with a little water, and after placing it in brick moulds, to expose it for a short time to the rays of the sun, when it is at once employed in building their houses. The cement used to bind these bricks together is much of the same nature, or perhaps has the addition of a little lime. As a building material it is durable and inexpensive.

Water lodges in hollows in the gypsum rock, and, in process of time, often wears away deep funnel-shaped cavities. The sulphate of lime then apparently separates from any carbonate, if one may judge from the presence of stalactites and selenite close together in the same cavities. These basins in the gypsum are called *Gyps Schlotten*, by which name they are known to every peasant; in dimensions they vary, some attain 50 or 100 feet in depth, while they often ramify internally so as to offer the most picturesque and fanciful forms. Far more beautiful than the many well known calcareous caverns, which are at best rugged and uncouth, the *Schlotten* have gracefully arched roofs, now low, and immediately afterwards rising into a noble vault, like the chapels and naves of some Italian cathedral; the dazzling white of the smooth water-worn rock, only here and there blemished by the black veinings, adds to the imposing nature of the scene, which on holiday occasions is one not easily forgotten. So alive are the people to the beauties of these caverns that two of them, at least, near Eisleben, are usually once a year converted into festive halls,

> "Where young and old come forth to play
> On a sunshine holiday."

A careful study of the *Gyps Schlotten* is often of the most vital importance in the working of the mines, for the life and safety of the miner here sometimes depends as much on it as that of the collier on the care with which fire-damp is avoided. In fact, near Sangerhausen, the men were lately proceeding rather unwarily through the gypsum, when the able *Schichtmeister* fortunately came in and desired them not to go any further before boring, as he was convinced that a large gypsum basin was not far ahead. Scarcely had the borer gone a fathom or two into the rock when the reservoir was tapped. Had not this precaution been adopted it is possible that the men might have lost their lives, or been dangerously hurt by the outrush of the waters. When once a *Schlott* has been drained the surrounding rock becomes much drier, nor does it refill. The vegetation in the immediate neighbourhood of a *Gyps Schlott* is perceptibly different; thus we see willows luxuriating, while ferns and other classes of plants are there found, although not a single individual could be met in any other part of the gypsum formation; the rank growth of many succulent plants is equally striking, so that where the *Schlotten* are superficial the botanist is made aware of the phenomenon no less than the geologist. A knowledge of botany would frequently be of great help in making a profound geognostical study of this interesting district.

The gypsum seldom presents any distinct marks of stratification, indeed, I was confidently assured by an acute observer, who has paid much attention to the geology of the district, that it was impossible to tell the dip. I believe, however, that it is perfectly feasible, having ascertained it in numerous places, especially in the neighbourhood of a great fault, and where the dip of the strata, inclining at a considerable angle, coincided with the slope of the hill; the means I adopted was to choose as a starting point a spot where selenite was abundant, and to calculate the dip by the position of the crystals.

Where igneous rocks have come in contact with the gypsum,—such at least is the best explanation which I am prepared to give of it,—the latter has been very much indurated, and by the elevated temperature has lost its water, so as to have become anhydrite. This latter rock has a pale blueish tint; instead of being sufficiently soft to cut with a knife like the gypsum, it constantly requires to be blasted with gunpowder, whence the expense of driving levels through it is at least as much again as in the former instance.

A remarkable form of sulphate of lime is found in small quantities in the gypsum—this is *Schaum Spath*, a mineral so much resembling physically the talcose schists in the neighbourhood of Carrara, as scarcely to be distinguishable from them by the eye.

Next to these Permian strata come other sandstone beds, lying uncomformably on them; they are Triassic, or among the older members of the Mesozoic series. This *Buntersandstein*—variegated sandstone—often closely resembles the *roth Liegendes*, but the ferruginous particles seem to be rather purple than red, as in the older rock. In both cases the quartz remains white, the whole mass not appearing of an uniform colour, as in the representatives of the same formation in England. By far the greater part of the beds of *Buntersandstein* consist of semi-indurated sand, streaked and veined in the most irregular manner, whence its name. At one time it is white or yellowish, at others green, red, or deep purple, mixed up in wavy lines. Sometimes, precisely the same purple colour and schistose character are noticed as were alluded to while describing the Permian strata; a very experienced eye is required to tell one from the other. They are dotted over with small scales of mica, possibly also of selenite, but the size of the fragments is too small to ascertain this without the aid of a microscope. *Buntersandstein* easily disintegrating, the hills which it composes assume a rounded form; the slopes are gentle and the soil light. Potatoes, corn, and other edible plants flourish in this district, as well as cherry trees, but the porosity of the rock is a drawback to the miner, for it absorbs all the rain-water which falls on the surface, and which has, consequently, to be artificially pumped out.

North of Eisleben, but entirely absent on the Kyffhaüser (as is the *Buntersandstein*), is a narrow belt of limestone, not found in Great Britain, which, from the immense quantity of shells which it contains, is called *Muschelkalk*, (shell limestone). It is fawn-coloured, or gray, andabounds with brachiopods.

After the *Muschelkalk*, a great hiatus occurs in the succession of strata throughout this entire district, so that with a single stride we pass to the Tertiary period, represented by deep deposits of clay with brown coal, a fuel to be literally obtained in any quantity desired. The quality of the brown coal will be discussed in its own place. The clays are principally slate-blue or gray, sometimes accompanied by valuable beds of white silicious clay of excellent quality, used in the manufacture of *Chamotties*, or fire-bricks, for furnaces. The heavy price of transport from other parts of Germany or abroad, renders it of the greatest importance to test the relative value of these fire-clays, and were anyone to experiment systematically on them, his labours would be well repaid, for a large consumption would be at once secured the moment a locality had acquired the reputation of possessing clay of more than ordinary refractory properties.

The brown coal formation is very extensive, and fills most of the low ground skirting the Hartz to the E. and S.E. It is covered in autumn with magnificent crops of beetroot, vegetables, and tobacco of an inferior quality, and may be pierced for a depth of 30 or 40 feet without finding the smallest stone. The only newer formation than the brown coal, is the local alluvial deposit along the courses of the valleys, the chief of which is the plain of the Helme, so remarkable for its fertility as to have acquired the name of the Goldene Aue,—(the golden plain.)

In addition to these aqueous rocks the neighbourhood of Hettstädt has been disturbed by an eruption of melaphyry, a complex rock, consisting of pyroxene with labradorite or oligoclase, reddish brown, with small green spots, and intensely hard. It has indurated the adjacent strata, but is itself so difficult to blast that the price for making a few feet of level through it is almost fabulous, the operation requiring an incredible time. We shall soon see that a *Melaphyrkuppe*, or eruption of this rock, has been pierced in order to construct the celebrated adit level at Mansfeld. As far as I have had opportunity of observing, this is the only place where it occurs in this district. East of Eisleben is a porphyry eruption, in the vicinity of Wettin; and of posterior age to the carboniferous formation, for both at Wettin and Lobejun the latter appears to be somewhat altered by it. In some spots it becomes a kind of anthracite, and is of great economic importance for the smelting works.

Through subsequent unequal elevation of the strata by subterranean causes, and their still newer denudation, the copper-slate is no longer continuous as originally, while in many places it lies at such a great depth that we have no means of examining it. On this account this bed may, for convenience, be considered as forming three distinct basins, two in Prussian Saxony, the third in the principalities of Schwartzburg Rudolstadt, and Schwartzburg Sondershausen. True, the employment of the word basin, the best which suggests itself, is rather arbitary, for we have not always a very well-marked margin to circumscribe them. Although absent on the mountain ridges, the copper-slate re-appears on the opposite flank, the upheaved older rocks forming the higher point. The principal and only well-defined basin may be called that of Eisleben; the whole of the *Kupferschiefer* is there the monopoly of the Mansfeld Company. The best portion of the Sangerhausen basin is likewise the property of the same enterprising body, but lately a new undertaking, called the Stollberg Kupferschiefer Company, has been commenced; they have begun working at the western end, at the extreme south flank of the Hartz. This little strip of country belongs to the Count of Stollberg, but since he is under Prussian protection it practically forms part of the latter monarchy. The last basin is that of Frankenhausen, stretching across the valley of the Fraukenhaüser Wipper from Udersleben to Sondershausen, but there far too deep to be worked; to the north it rises on the back of the Kyffhaüser mountains to the height of 1,000 feet above the sea level, and is a vast and still almost unworked expanse of cupriferous ground.

The margin of the Eisleben basin, by which we mean the outcrop of the copper-slate, may be distinctly traced from south-west to north, and thence to north-east of the town, the curve roughly forming part of an ellipse, the major axis of which runs from north-west to south-east, the direction of the general strike of the strata; outwards this curve is everywhere fringed by the *Roth Todtliegendes*, rising into bold eminences near Mansfeld, one of which is crowned by the superb ruins of the residence of the once powerful and luxurious proprietors of the mines, the multipartite family of the counts of Mansfeld; other heights of the *Liegendes* stretch northward to Hettstädt, and in the direction of Aschersleben, but melt into lesser hills in receding from the Hartz to the south. The eastern margin of the basin approaches the Saale, a tributary of the Elbe, flowing through Halle and the little towns of Rothenburg and Friedeburg an der Saale. The configuration of the ground within the Eisleben basin is rather undulating than hilly, except to the west, where a steep escarpment of gypsum, facing outwards and closely following the outcrop line of the copper-slate, commences near Wimmelburg, a mile out of Eisleben, and sweeps round to the north-west above Creisfeld, Alsdorf, and Hergisdorf, after which it blends with the brown coal basin and the heights of Mansfeld. This leaves an elevated tract of country composed of gypsum, *Buntersandstein*, and *Muschelkalk*, at least 100 feet above the level of Eisleben, and gently inclining towards the susse and salzige Seen to the south-east. The small brown coal "nests" found here and there on this elevated ground are too insignificant to be of more than purely local and private importance.

By making a section from north-west to south-east we should best perceive the synclinal or basin-shaped form of the copper-slate strata; they can only be worked near the outcrop, for in the centre they lie at the depth of many hundred fathoms. The majority of the shafts, lying at some distance, with more or less parallelism to the axis, have been divided into two groups, viz., the *Obere* and *Untere Reviere*—somewhat equivalent to upper and lower "setts." These *Reviere* are again divided into numerous smaller ones. A *Revier* is the primary administrative division of mining or forest property, for convenience of management; each has its superior officers, with their staff; the forest *Reviere* are superintended by a forester (*Förster*); the mining *Reviere* are generally supervised by a *Geschworene*, or local Government Inspector, whose functions, properly speaking, extend rather in the way of helper and counseller to the Company than in any manner to restrict its powers and free mode of action. The ground actually worked away, and no longer of any use, skirts the basin all round; within this comes the present concession, extending further inwards, but this is a comparatively narrow strip having an average breadth of two miles, being thirteen miles long, that is from the Friedeburg Works, near Rothenberg on the Saale to Wolferode.

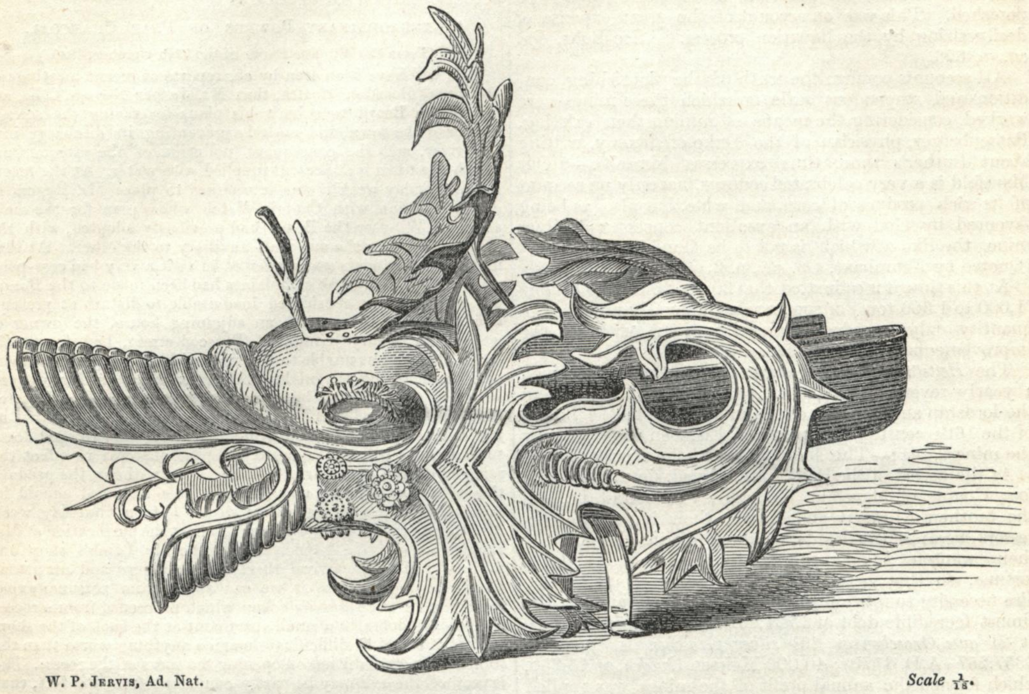
Spangenberg, in his ponderous "Mansfeld Chronicle," ascribes the origin of the mines to two men named Napian and Neuke, under date of 1199. Napian discovered the *Kupferschiefer* by mere accident, while digging a cellar near the then insignificant village of Hättstädt, and having it assayed, the result proved so satisfatory that he gave the present name of Kupferberg to the spot. Spangenberg attributes the prosperity of Hettstädt, and its rank as a town, to the mines which soon sprung up around. The statutes of Napian and Neuke may be seen in the Gewerken Haus, in Eisleben, a place which also speedily shared in the benefit of the discovery, and whose citizens devoted themselves earnestly to mining enterprize:—

> "Eisleben, wo Bergleut' schön
> In tiefe Schacht hinunter gehn
> Und fordern edles Erz zu Tag
> Mit ihrem fleiss'gen Hammerschlag."

The gigantic scale upon which these mines are worked is by no means a thing of yesterday, as may be judged by a careful walk over the ground. In approaching Eisleben towards evening from the west, that is by the post-road from Nordhausen, after passing the village of Blankenheim, we ascend to the top of the hill; the eye soars for many a mile around; the steeples and roofs of Eisleben repose peacefully enveloped in gray mist at the foot of the hills, on whose summit the tall forms of many engine-houses, with their gaunt chimneys, are picked out against the sky, while, at a greater distance, the silvery reflection of the lake indicates the spot where the drainage waters are conducted. Around us, on every side, little hillocks, scarcely larger than the graves in a country churchyard, and almost as close together, stretch to the right and left of the road, and have been for centuries overgrown with grass; as we advance, these hillocks, which might at first have escaped observation had they not been pointed out, assume larger dimensions, and present a distinct though partially filled crater; they become dotted over the fields, reminding one of a city of South American ant-hills; each is encircled at the base with a crown of brambles, giving a most singular effect to the landscape, as the intermediate space is highly cultivated land. Every hundred yards we proceed towards the town these mounds become larger and larger as also less numerous; they begin to bear a more rugged appearance, and instead of being clothed with vegetation present their sterile slaty faces to us, for these are newer burrows, which have not been subjected to the disintegrating action of the atmosphere sufficiently long to convert the rock into soil. A local law, common in such cases, stipulates that whoever rents ground covered with ancient burrows should annually bury a certain quantity of the barren mounds, in order to expose the original surface of the soil, and render the land fit for agriculture. Another moment and we have reached Wimmelburg, where the burrows are from 300 to 800 feet long, and 50 feet high, and nothing but a mass of stones. These are what are at present being thrown up by working the copper-slate, at a depth of a least 500 feet (80 or 90 *Lachter*).

Spangenberg relates how, in 1420, Count Busso VI. of Mansfeld, while staying at Venice, was agreeably surprised by the gift of a noble charger, with golden saddle and silver shoes, offered him on the part of the senate of the merchant city, as a token of their gratitude for the lucrative copper trade with Mansfeld. (*Sächsige Chronik*, 1585, p. 523.) A fine reclining statue of Busso ornaments his tomb in St. Andreaskirche, in Eisleben. I sketched one of the graceful dragon's head water-spouts, formerly ornamenting the Gewerken Haus in Eisleben, and now in the Mining School, as appropriate for the *Journal*. It is a charming piece of *repoussé* work, attributed to the time of Bruno the elder, circum 1600. Many such water-spouts still exist in the vicinity; in former times they were so abundant at Neustadt on the Orla, near Weimar, that Luther facetiously called it the *Drachenstadt*, or "dragon-town." The local use of copper, for many purposes where not generally employed, is very striking. In St. Andreas church, in Eisleben, is a fine brass monument to Herr Von

Eveleven; and four magnificent brass chandeliers, valued at £140 each, presented by the people of Nuremberg, in 1610. There are also some ponderous brass candlesticks, apparently of far older date. The town hall in Eisleben was originally roofed with copper, but this was removed and sold about 20 years ago.



W. P. Jervis, Ad. Nat.

Scale $\frac{1}{15}$.

Dragon's Head Water-spout, formerly on the Gewerken Haus at Eisleben.

For a long period the mines belonged exclusively to the counts of Mansfeld, who held them as direct fief from the emperors of Germany (*kaiserliche Lehn*); the patents or warrants under which they exercised their authority were styled Imperial fief letters (*kaiserliche Lehnbriefe*). We read of the counts being enfeoffed by such Imperial letters patent as early as the middle of the 14th century, thus:—The Emperor Charles IV. issued a *Lehnbrief*, or *beneficium*, concerning the mines to Count Gebhardt, in 1364; Sigismund, in 1437; and Frederick III., in 1444, to Volrath, Günther and Gebhardt, and another in 1457, in which he specifies, among other things, the important and assiduous services which the counts had rendered him on manifold occasions, and might in future render. Bernhardt von Rohr (*Geographische und historische Merkwürdigkeiten des vor-oder unter Harzes. Frankfurt*, 1736, page 707.)

The right of possession and administration of justice in these mines, on the part of the counts, did not embrace the entire country, but was confined to the places designated in these letters. "It extended, 1st, from the Salt Lake (*Salzige See*) to near Hornberg, passing by Rothenschirmbach, Sittchenbach, the [then existing] monastery of Schweinswande, the forest of Krummenhain, Emseloh, the former mansion of Erzgerode, the wood of Eptischine, and the now destroyed village of Lichtenhain (Lichthagen), between Gorenzen and Wippra; was bounded by the Wippra, near Burgörner and Hettstädt, and thence stretched away to the Saale, following its course upwards to Salzke, and returning to the Salt Lake. 2nd. The Castle of Morungen, with the mines comprising the present administrative district of Gross Leinungen, above Sangerhausen." Ahrens, (*Historische Nachrichten über die merkwürdigste Städte, &c., in der Graffschaft Mansfeld, Eisleben*, 1834, p. 48.)

In 1443 the counts of Mansfeld enacted a law whereby the mines should continue undivided. Von Hagen; (*Münzbeschreibung des graflich und fürstlichen Hauses Mansfeld. Nuremberg*, 1778, p. 261.)

In 1484 the Mansfeld mines, ceasing to be held at *Reichslehn*, or in direct fief from the emperors, the legal rights and imperial privileges (*Rechtsgerechtsame*) were handed over to the electors of Saxony, from whom the counts of Mansfeld were henceforward obliged by this treaty to farm them; they were styled *Erz in erstem Feuer*. Up to this year the tithes (*Zehnte*) went exclusively to the counts, but now the electors demanded half for themselves. In 1486, a year or two later, Duke Albrecht invested the counts with all the mines which they had originally held in fief; the revenues continued to be the right of the counts, but they did not work all the mines themselves, preferring to hand them over to certain families in hereditary fief. This gave origin to two classes of mines: those portions (*Bergtheile*) worked by the counts themselves constituted the *Herrenfeuer*, the rest were styled *Erbfeuer*, literally proprietory and hereditary hearths. Already in 1487 the start taken by the new owners, and the riches they derived from their industry, is apparent from the historical documents of the period. The Duke of Brunswick, happening to be on a visit to the Castle of Mansfeld, began loudly to boast of his riches, to which, for only answer, one of the counts of Mansfeld retorted that he for his part was poor, but that his subjects were all the richer. To clear up all doubt, he would order that one of them should exhibit a pile (*Schieferhöhle*) of Mansfeld Thaler, and that another should ride up to the castle with 100 horses. No sooner said than done; in a short time Christoph Stahl, a smelting-house proprietor, produced a cartload of the precious silver coin; and Johann Zörner appeared in the square with 100 of the steeds he employed in conveying ore to the works. (Krumhaar, *Luther's Vater's Haus*, p. 3.)

That the ores from the lower *Reviere* were poorer in silver than the rest was known many centuries ago, for in 1536 a mining law was issued by the counts, enacting that whoever should fraudulently adulterate the Hattstädt ores with those from Mansfeld or Eisleben should be punished. This was on account of the great expense of desilverizing by the liquation process. (See Rohr, *Op. cit.*, p. 696.)

All accounts confirm the truth of the flourishing condition and stupendous scale on which these mines were worked, considering the means of mining then existing. Ratzenberger, physician of the Duke of Saxony, writing about Luther's time, thus expresses himself:—"Our Mansfeld is a very celebrated country, not only on account of its rich produce of corn and wine, but also as being favoured by God with an excellent copper and silver mine, the like of which is not to be found in Germany." (Quoted by Krumhaar, *Op. cit.*, p. 2.)

At this time it is estimated that 20,000 to 30,000 *Centner* (1,000 to 1,500 tons) of copper were annually produced, a quantity only exceeded during late years, with all the improvements of modern science.

The *Hettstädter Chronik* states that the counts obtained a yearly revenue of about 25,680 *Thalers* (£3,850) from the lordship and working of the mines. At the beginning of the 16th century two parts of Eisleben were built by the miners, viz:—The Nuszbreite and the Neustadt.

At the period of the Reformation lived, simultaneously, four Counts of Mansfeld, Gebhardt VI., Bolrad II., and the brothers Albrecht and Ernst; their immediate successors became the heads of three distinct lines. By their wanton luxury this family squandered a large fortune, so that before long they were compelled by dire necessity to retire into private life, aggravated by the almost incredible debt of 2,721,961 Meissen *Gulden*, which at 21 *gute Groschen* or 26¼ *silber Groschen* is equal to £357,257 (A.D. 1570); 40,000 Meissen *Gulden*, or £5,250, which formed the annual profit of the mines, was applied to discharge this heavy burden.

(*To be continued.*)

Home Correspondence.

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CHARCOAL AIR FILTERS.

Sir,—As I doubt not that the columns of the *Society of Arts Journal* are open to facts affecting science and fair-play, I would beg space in them for a few observations on Doctor Stenhouse's paper, appearing in that publication of the 14th inst.

The writer takes to himself the merit of having discovered the extraordinary properties possessed by "Charcoal," in drawing unto itself and destroying the gaseous emanations from sewers, &c., &c. Throughout the whole of his present paper, as well as the former on the same subject, published in 1854, he assumes the principle of "the charcoal air-filter" to be his invention, and concludes in the present instance by saying, "I think it but justice to myself to state that I have no pecuniary interest in the charcoal air-filter. Though strongly urged to do so, I refrained from securing it by patent, on the ground that inventions for the prevention of disease and death ought to be sold at the lowest possible price, and should not therefore be encumbered with the expense and restrictions attendant upon patent rights."

The truth is, that so far back as 1847-8-9, my publications and papers read at the Botanical Society of London, King's College, the Mechanics' Institute, the Royal Society of Dublin, and the Sanitary Association—on the discoveries I had then made of the special properties of "Peat Charcoal," gave full facts of its powers for deodorizing vitiated atmospheric air, and drawing to itself the deleterious gases afloat in them, as well as those afloat in sewage matter; and described the "air filter" composed of layers of granulated charcoal held in position by wire gauze—exactly what Doctor Stenhouse now claimes as his invention. And the following letter and article, which appeared in the Windsor paper, describes when and where I put "the air filter" principle into actual operation so far back as 1849:—

"Extraordinary Powers of Peat Charcoal.

"(From the Windsor Paper of the 27th October, 1849.)

"It will have been seen by our reports of recent meetings of our Local Board of Health, that Mr. Jasper Rogers, C.E., attended the Board to submit his plans for saving the sewage matter of the town, and entirely preventing its discharge into the river, and the consequent pollution of the stream from which the town is at present supplied with water. At the meeting of Monday week it was determined to place Mr. Rogers in communication with Captain Vetch, whose plan for the main sewer of Windsor the Board had previously adopted, with the object of making the one plan auxiliary to the other. At that meeting Mr. Rogers was requested to visit a very bad cess-pool, respecting which great complaints had been made to the Board, but which it was considered inadvisable to disturb at present, and especially to examine an adjoining house, the owner of which, Mr. Henry Lamb, of Peascod-street, had frequently stated that he was unable to live in it without keeping the doors open, even during the night. After examination, Mr. Rogers, who was accompanied by some members of the Board, stated that he would undertake to render the house pure, and that he was authorised by the Irish Amelioration Society to send down to Windsor a sufficient quantity of peat charcoal to effect the removal of the contents of the cess-pool without the production of any annoyance, and which it was arranged should be accomplished in the following week; but on Thursday week Mr. Rogers returned to Windsor to effect the purification of Mr. Lamb's house. We happened to enter Mr. Lamb's shop immediately after the arrival there of Mr. Rogers, and our attention being requested to it, we can speak from personal experience as to the *mauvais odeur* which proceeded from a recess enclosed by doors, in a small apartment at the back of the shop. In fact it would be difficult to imagine anything worse than the stench that was emitted on opening the doors of the recess. The extent of the evil may be partly conceived from the fact, that the insides of the doors were actually blackened by the action of the sulphuretted hydrogen drawn up by capillary attraction through the wall, from the contents of the cess-pool resting against it beneath.

"By a simple arrangement, Mr. Rogers placed a comparatively small quantity of peat charcoal, accurately granulated, resembling gunpowder in appearance, in such a position, in contact with the wall, as to intercept the gases as they rose, holding the charcoal in its place by a slight wooden boarding. In the course of half an hour after the operation was completed, Mr. Lamb states, the atmosphere of the room was purified, and, to use the words of Mrs. Lamb, 'she felt as if there was a cool breeze in the house.'

"On visiting the place the next day, we ourselves found that the objectionable odour was entirely gone; and the satisfaction of the inmates of Mr. Lamb's house at the result of the operation was expressed in the warmest terms. Mr. Lamb states that he has frequently been obliged to hold his breath on coming down stairs in the morning, until he could get the door open, and that the difference the morning after the operation was most extraordinary.'"

It is almost unnecessary to say more on this special point; the discovery of the principle, and the putting of it into actual practice, are due to myself; the delay in its general adoption is due to apathy and opposition.

The peculiar powers of vegetable charcoal, or of any charcoal, in drawing to itself the impurities afloat in the atmosphere, were not, if known to anyone, published when I first wrote and lectured on the subject; and one of the first chemists in the world, Dumas, the President of the Commission appointed, at my request, by the Emperor of the French, to investigate the facts of the statements respecting the properties of peat charcoal, used the following expressions to his Majesty in my presence, at the Palais d'Elysées, a short time after I had used the air filter at Windsor. He said, "I have taught my pupils the absorbent and disinfecting powers of animal charcoal on substances, but it has been reserved for this gentleman [pointing to me] to discover the singularly great powers of the charcoal of peat upon vitiated air."

From that period to the present I have unceasingly laboured, against every possible opposition, to make the world understand the numberless powers and capabilities of vegetable charcoal, the most powerful of all being the charcoal of pure peat, principally owing to its peculiar porosity, but also of other properties belonging specially to itself. From time to time almost all I have stated has been gradually admitted; but from day to day, at present, some one or other makes property of my facts. In the present case three scientific names are brought before the world as those to whom the present good is due, whilst my unpretending name is completely ignored.

Permit me to conclude my remarks by the following quotations from the *Freeman's Journal* of the 6th December, 1854:—

> "It is a curious fact that nearly all that has been recently put forward by Professor Stenhouse was long since enunciated by Mr. Jasper Rogers. But Mr. Rogers not being a chemist, and being the patentee of peat charcoal, his assertions did not pass current with the public, as will the independent evidence of such a man as the Professor, whose alleged discoveries we have been alluding to."

I am, &c., JASPER W. ROGERS.

Peat House, Robertstown, Co. Kildare,
17th June, 1861.

ELEMENTARY EXAMINATIONS.

Sir,—The establishment of a Central Committee to provide a system of Elementary Examinations on a uniform and fixed standard, is an important step, and deserves the attentive consideration of all who are concerned in the management, or interested in the welfare, of educational Institutes. It can hardly be necessary to insist upon the advantage of extending the stimulus of periodical examination to a class below those which are influenced either by the Society of Arts or the Universities. It must be obvious that if the benefit gained is great in the latter cases, it must be still more so in the former, and that the general adoption of the scheme propounded will doubtless have the effect of inducing a greater number of candidates to prepare themselves for the higher grades of certificates.

The Central Committee, by providing the necessary papers for examination, will not only have secured the important object of a uniform standard, by which the comparative merits of candidates in various places will be fairly tested, but they will have removed one of the greatest obstacles to the establishment of local examinations, owing to the great trouble and expense involved in the preparation of questions. But, by having them distributed at cost price, comparatively little expense will be incurred, and many provincial Institutes will be encouraged to adopt the plan.

It will be seen by the circular issued by the Central Committee, that the Elementary Examinations will be divided into two grades, suitable for junior and senior candidates, though persons of both sexes and all ages will be eligible for either. The programme comprises the rudiments of a sound English education, while sufficient variety is afforded to enable candidates to have a choice as to the direction of their studies.

In many small towns and villages there will no doubt be an apparent difficulty in finding persons competent and willing to undertake the responsible duty of examining the papers and awarding the certificates. This difficulty might, however, be in a great measure obviated by forming branches of Local Boards already established, and in every Institute, or even village, appointing some person of known probity, whatever may be his intellectual attainments, to see that the conditions are honestly carried out, and the papers worked by the candidates themselves without assistance. The papers should then be forwarded by the first post to the Local Centre, and there examined and decided upon.

It is of great importance that the widest possible publicity should be given to the scheme, and it is therefore to be hoped that the several Local Boards throughout the kingdom will distribute the programme to every town and village within their influence, with such particulars as to their willingness to examine the papers, and supply further details, as may be necessary. Local subscriptions will, no doubt, in many cases provide funds for Local Prizes, whilst the certificates will be the most legitimate objects of ambition, having, from the nature of the examination, a national value, current everywhere as testimonials of good character, as well as of attainments in the elements of knowledge.

Very great facilities would be given to the general adoption of the system, if the several Institutes scattered throughout the kingdom, under the names of Mechanics', Literary, and Scientific Institutes, Working Men's Colleges, Mutual Improvement Societies, and other titles, would form themselves into county or district unions, to gain the benefits of organisation and united action. The initiative might be taken by the Institute of the county town soliciting the co-operation of the other Institutes in the county. A small annual subscription would provide the necessary expenses; an annual gathering would bring the several Institutes into personal communication; and local sympathy and support would be more effectually promoted than by isolated efforts. I should be very willing to give assistance in the suggestion of rules, proceedings, &c., if the secretary of any Institute will write to me, addressed to the Mechanics' Institution, Leeds.

The certificates to be awarded to the successful candidates at the Preliminary Examinations should be works of art, so as not only to be desirable for the successful application to which they certify, but also form ornamental decorations for the walls of many a cottage. The Society of Arts must have many competent friends, who would volunteer the preparation of an elegant design, if the wish for it were made known; and as copies might be multiplied without limit, thereby diminishing the charge to each Institute, it is to be hoped that the cost of a really good engraving will not be considered an objectionable item.

I am, &c., BARNETT BLAKE.

RIFLE PRACTICE MARKING.

Sir,—At a recent meeting of the Society of Arts, Lord Elcho remarked:—"What they wanted at the Wimbledon meeting was an apparatus which would enable the public to judge of the merits of the firing, as well as those more immediately interested in the results."

The following system, founded on a method which has been used by Capt. Halford, at Westow, Leicestershire, fulfils the above requirements, and it also closely indicates the position of the hits on the target, with the additional advantage of showing who has made them.

Instead of the markers being stationed near the iron targets, they occupy a position close to the shooters, and are furnished with a telescope of sufficient power to show the chequered lines and bullet marks on the target from the longest ranges. They are also provided with a large light frame, on which is shown an imitation of the real target, and which, for distinction, may be called the marking target; this is elevated abont 8 feet from the ground, in order to be seen by the spectators over the heads of those before them, and its size is regulated by the number who may require to see it, a frame 6 feet by 4 feet being sufficiently large for 800 spectators standing at each target. The markers are further provided with discs, to represent bullet marks, which are made proportionate to the size of the marking target; these discs are not merely black and white patches, but are printed with figures corresponding to the number of the shooters up to nine; but as firing-squads generally consist of 10 to each target, one is numbered 0 in order to obviate the introduction of two large figures, and keep the number as large as the disc will allow. The discs are also printed with a small subordinate figure, to indicate whether it is the 1st, 2nd, 3rd, 4th, or 5th shot of the shooter. They are printed with a white figure on a black disc, or a black figure on a white disc, according as they are required to be on the black or white portions of the marking target. There is also a set printed in red, to distinguish the hits in which the ball has struck the ground before reaching the target, but these hits may be diminished by placing the target on stilts at about 3 feet from the ground.

For quick firing one marker observes the hit through the telescope, and points to, or calls out, the number of the square which is struck, to the marker stationed a few feet above him at the marking target, who then takes a disc, corresponding with the shooter's number, from a partitioned box, and affixes it on the proper part, but when time will permit each marker to register the same shots he has observed alternately, the marking is rendered more accurate, and with the aid of a properly constructed rod to affix the discs from the ground this may be quickly done.

As targets are generally made, it is difficult to see the hits on the bulls-eye and other black portions, even from the mantlet under the old system. To remedy this the bulls-eye and the circle round "centre" should be filed bright and covered with a black mask, which will come off and leave a light surface where the ball strikes; the mask being mixed with turpentine to preserve the metal from rust. The chequered lines are also, generally, too indistinct, and Captain Halford has found this tolerably remedied by drawing a triangular tool down the grooves to remove the mask and show the black metal on the white parts and the bright metal on the black portions of the target; but the lines are rendered still more distinct by painting them.

There are a number of smaller details which it is unnecessary to describe, as they will easily be filled up by any one wishing to use the method. Indeed, the whole matter is so simple, that it is probable a part or all the features now given may have been found to answer by others, without the writer's knowledge, and if so, it goes to prove that the method deserves to be more widely known and employed.

I am, &c., E. T. LOSEBY.

18th June, 1861.

CONSTRUCTION OF RIFLE BARRELS.

Sir,—As we are now in a transition state from a "nation of shopkeepers" to a nation of riflemen, it will not be inappropriate to inquire what is the most suitable metal to use for barrels for that most delicate weapon, the rifle, for on the barrel will depend that constant accuracy in firing which it will be the pride of our riflemen to acquire.

The first question presenting itself is, what are the essential points in a rifle barrel? The reply, a metal perfectly homogeneous and a true bore. I am not going into the question of rifling—that belongs, not to the barrel maker, but to the gun or rifle maker. Let us see how near to these essentials the present rifle barrel comes. All military barrels are, or should be, made from an iron known in the trade as Wednesbury iron, which is, I believe, the best iron in Britain, excepting such as has been purified in the crucible. This is supplied to the barrel makers in "scelps," about a foot long, half a foot broad, and half an inch in thickness, and by them rolled through elliptical rolls some fourteen times, forming them into hollow taper tubes, ready for the boring and turning machines, where we will at present leave them till we examine the merits of iron as a substance for barrels.

The process of rolling elongates the fibre longitudinally, and when the barrel passes into the hands of the rifler the fibre is cut through more or less, according to the turn of the spiral, and presents, under examination with a microscope, a ragged edge, causing the ball to strip and the barrel to foul. Another cause of the barrel fouling and the ball stripping is the irregularity of the iron. All iron, with the exception of the before-named crucible-purified contains a considerable amount of semi-metallic and earthy substances, most of them being harder than pure iron. After a few shots the barrel gets warm, the expansion is irregular, the hard places expanding more than the soft ones, and thus altering the accuracy of the bore.

The better class of rifle barrels are made of a mixture of iron and steel, and are more irregular in their composition than the military ones, which, bad as they are, I look upon as being superior, as far as metal is concerned, to the fine figured ones. An acid test will make any of them as rough as the rind of an orange in a very short time.

As to bore, it was the opinion of Mr. Whitworth that it was impossible to get a true hole unless bored out of the solid, and, carrying his theory into practice, he has proved its truth by producing a bore hitherto unequalled. He uses cast steel for his barrels, and that is the metal, properly prepared, that I hope to see generally adopted, for, being perfectly homogeneous, and of a granulated structure, you have always an equal expansion and a beautiful smooth bore, and in strength it is as three to one in comparison with iron. I am told that all good American rifles have cast-steel barrels, which have been bored out of the solid bar, while we content ourselves with iron, because we have only one maker (Mr. Whitworth) at present, and he will not supply barrels, but only his own finished rifle. Let our Birmingham barrel makers prepare for supplying these barrels, for depend upon it every rifleman who can afford it will possess one when they are to be had.

A rifle maker in Glasgow is going to considerable expense in machinery for boring out of the solid, merely to supply his own customers. It is his opinion that when sportsmen will dispense with appearance, and not demand a fine figured barrel, steel barrels will come largely into use for sporting purposes.

I am, &c., W. HAWKSWORTH.

Avon Steel and Iron Works, near Linlithgow,
June 27, 1861.

PARLIAMENTARY REPORTS.

SESSIONAL PRINTED PAPERS.

Par.
Num.

Delivered on 6th June, 1861.

211. Metropolis Local Taxation—First Report from Committee.
306. Army (Excess of Expenditure)—Statement.
307. East India (Councils)—Copy of Despatches.
303. Army (Grants' Kitchen)—Return.
158. Bills—East India Loan.
159. Bills—Sheriff Courts (Scotland) (No. 2).

Delivered on 7th June, 1861.

295. Houses of Parliament (Fresco Paintings)—Return.
302. National Collections—Return.
305. Navy (Woolwich Dockyard)—Return.
308 Army (Drying Rooms)—Return.
309. Wexford Harbour—Treasury Minutes, &c.
279. New Ross Electoral Division—Return.
160. Bills—Tramways (Ireland) (Amended).

Delivered on 8th June, 1861.

281. Sugar, &c.—Return.
288. Coast Guard Stations—Returns.
311. Railway and Canal Bills—Seventh Report from General Committee.
312. Army—Supplemental Return to Paper No. 213 of the present Session.
259. East India (Finance and Revenue Accounts)—Parts 1 and 2.
247. Coroners' Inquests (Metropolis)—Return.
304. Expiring Laws—Report from Committee.
317. Ecclesiastical and Church Estate Commissions—Abstract of Return.
162. Bills—East India Council, &c.
163. Bills—East India (High Courts of Judicature).
164. Bills—East India (Civil Service).
165. Bills—Dealers in Old Metals.
166. Bills—Parochial and Burgh Schools (Scotland) (No. 2).
168. Bills—Leases, &c., by Incumbent's Restriction.
Census of England and Wales (1861)—Return.
Topographical Department War Office—Report.

Delivered on 11th June, 1861.

301. Army (Chaplains, &c.)—Account.
299. East India (Courts Martial)—Return.
161. Bills—Industrial Schools (Scotland)
170. Bills—Durham University.
Manufactures, Commerce, &c.—Reports by Her Majesty's Secretaries of Embassy and Legation.

Session, 1860.

383 (B1). **Poor Rates and Pauperism—Return (B).**

Delivered on 12th June, 1861.

161. Public Health—Third Report of the Medical Officer of the Privy Council.
318. Malt—Return.
319. Public Works (Ireland)—Account.
146. Bills—Transfer of Stocks and Annuities.
167. „ —County Voters (Scotland) (amended).
171. „ —Excise and Stamps (as amended in Committee, on Re-commitment, and on Consideration, as amended.)
172. „ —Vaccination.

Delivered on 13th June, 1861.

324 (A). Poor Rates and Pauperism—Return (A).
327. Aldershot—Return.
286. Transportation—Return and Evidence.
173. Bill—Courts of Justice Building (as amended by the Select Committee).

Delivered on 14th June, 1861.

287. East India (Indigo Contracts)—Copy of Memorial, &c.
310. Naval Officers—Return.
321. Public Business of the House—Lords Report.
325. Education Commission—Return.
329 Public Accounts—First Report from Committee.
174. Bills—Locomotives (amended).
176. „ —New Provinces (New Zealand).
177. „ —Offences in Territories near Sierra Leone, Prevention.
178. „ —Attorneys and Solicitors (Ireland).

Delivered on 15th and 17th June, 1861.

313. Fire Insurances—Return.
320. Bankruptcy and Insolvency Bill—Lords Report.
322. Poor Removal (Rebecca Kearney)—Return,
342. Pauper Emigration Metropolis)—Return.
338. Railway and Canal Bills—Eighth Report of the General Committee.
328. Highways (South Wales)—Return.
289. Common Law Courts (Ireland)—Return.
322. Poor Law (Medical Relief)—Return.
179. Bills—Removal of Scotch and Irish Poor (amended).
181. „ —Wills of Personalty by British Subjects.
182. „ —Public Works (Ireland) (Advances and Repayments of Moneys).
184. „ —Dean Forest and Hundred of St. Briavels (as amended by the Select Committee).
Belgium (Passport Regulations)—Despatch from Lord Howard de Walden.
Submarine Telegraph Cables Construction—Report.
Customs—Fifth Report of Commissioners.

Delivered on 18th June, 1861.

314. Lunacy—Fifteenth Report of the Commissioners.
333. Poor Removal (Mary O'Connor)—Return.
335. Liverpool and Manchester District County Courts—Returns.
344. Nova Scotia (Gold Discoveries)—Return.
175. Bill—Piers and Harbours (amended).

Delivered on 19th June, 1861.

323. Poor Relief (England)—Second Report from the Committee.
169. Bills—Voters (Ireland) (No. 2).
185. „ —Chatham Dock Enlargement (as amended by the Select Committee).
186. „ —Appropriation of Seats (Sudbury and St. Alban's) (amended).
187. „ —Courts of Justice Building Act (Money).
188. „ —Wills and Domicile of British Subjects abroad, &c.
Railways in India—Report by J. Danvers, Esq.

Delivered on 20th June, 1861.

283. East India (Nawaubs of the Carnatic)—Return.
331. East India (War Charges)—Accounts.
341. East India (Oude)—Return.

Delivered on 21st June, 1861.

334. Vessels and Tonnage, &c.—Return.
339. Sale of Gas Act—Return.
340. Constabulary (Ireland)—Paper.
348. British Museum (Lighting by Gas)—Return.
349. British Museum (Establishment, &c.)—Return.
357. Civil Services—Estimate for Vote "On Account."
183. Bills—Municipal Corporations Act Amendment (No. 2).
191. „ —Government of the Navy.
Public General Acts—Caps. 17, 18, 19, and 20.

Delivered on 22nd and 24th June, 1861.

347. Navy (The "Warrior," &c.)—Return.
291. East India (Indigo)—Return.
337. Conveyance of Mails (Galway and America)—Return.
354. Education Commission—Copy of Paper by Mr. Tremenheere.
330. Shannon Improvement Works (Ireland)—Return.
332 (1). Poor Removal (Rebecca Kearney)—Further Return.
343. Army (Divine Service)—Return.
355. Scottish Universities—Paper.
362. Steam Ships (Parana, &c.)—Return.
364. Japan (Mr. Moss)—Return.
865. Glasnevin Botanical Gardens—Return.
368. Railway and Canal Bills—Ninth Report from the General Committee.
180. Bills—Local Government Act Amendment (amended).
189. „ —Bills of Exchange and Promissory Notes (Ireland) (amended).
192. „ —Bankruptcy and Insolvency (as amended by the Lords).
193. „ —Windsor Suspended Canonries.
195. „ —Metropolitan Police Force Pensions.
196. „ —Harbours (as amended in Committee and on Re-commitment).
197. „ —Passengers (Australian Colonies).

Delivered on 25th June, 1861.

345. Electoral Divisions (Ireland)—Return.
350. Militia (Ireland)—Returns.
358. Army (Effectives)—Return.

PATENT LAW AMENDMENT ACT.

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APPLICATIONS FOR PATENTS AND PROTECTION ALLOWED.

[*From Gazette, June 21st*, 1861.]

Dated 11th June, 1861.

1492. J. D. Harding, Barnes, Surrey, and W. H. Winsor, Rathbone-place, Middlesex—Imp. in drawing materials and apparatus for the use of artists.
1493. E. T. Hughes, 123, Chancery-lane—Imp. in extracting oil from seeds, and in machinery or apparatus employed therein. (A com.)
1494. C. Cheyne, Great George-street, Westminster—An improved method of constructing safety rifle and other gun ranges.
1495. R. W. Smith and D. Scattergood, Nottingham—Imp. in machinery for manufacturing looped fabrics.
1496. S. B. Singer, Southsea, Southampton—An imp. in the card of compasses.
1497. C. Chalmers, Edinburgh—Imp. in gas stoves.
1498. W. E. Newton, 66, Chancery-lane—Imp. in gun stocks. (A com.)

Dated 12th June, 1861.

1499. W. H. Walker, Liverpool—A floating hydraulic lift stage for raising navigable vessels or other heavy bodies above the surface of the water, and an improved method of "blocking" or "shoreing up."
1501. J. Hope and W. Greenhalgh, Bedford, Lancashire—Certain imp. in machinery or apparatus for cutting turnips, roots, or other substances.
1503. J. A. Callaud, Nantes, France—Imp. in the construction of electrical piles.
1504. J. Durrant, Fitzroy-square, and N. A. Harris, Bayswater—Imp. in the form and construction of chimney tops or appliances for surmounting chimneys in order to regulate the up currents and prevent the down draughts.
1507. J. Watt, 2, Westmoreland-place, Camberwell, Surrey—An improved mode of converting vegetable fibrous substances into pulp.
1508. J. Drew, Belgrave-terrace, Weymouth—Imp. in the adaptation of plates or shields to fixed and floating batteries, and also ships for the purpose of more effectually resisting shot or other projectiles.
1509. G. Cox, Victoria-terrace, Queen's-road, Holloway—An improved "floor dog" or cramp.
1511. D. Walmsley and J. Rostron, Disley, Cheshire—Imp. (partly for the purpose of preventing accidents) applicable to hoisting machinery used in mills, warehouses, and other places.
1512. R. Jobson, Dudley, and C. F. Varley, 4, Fortess-terrace, Kentish-town—Imp. in posts or supports for telegraph wires.
1513. J. P. Girard, Coutances, France—An improved coffee-mill.

[*From Gazette, February 28th*, 1861.]

Dated 23rd February, 1861.

471. J. Robinson, Rochdale—Imp. in machinery commonly called log frames for sawing timber.

Dated 4th April, 1861.

833. W. E. Newton, 66, Chancery-lane—Imp. in machinery for cutting files. (A com.)

Dated 5th April, 1861.

840. C. Storer, R. Jones, and J. Storer, Longford, Warwickshire—Imp. in railway brakes.

Dated 14th May, 1861.

1224. T. C. Boutet, 1, John's-place, Brunswick-road, Camberwell—Imp. in obtaining and applying motive power by æro-hydraulic means.

Dated 15th May, 1861.

1242. W. E. Newton, 66, Chancery-lane—Improved machinery for cutting chaff. (A com.)

Dated 1st June, 1861.

1376. L. Bilon and J. E. J. Nappey, 29, Boulevart St. Martin, Paris—Imp. in apparatus for manufacturing bricks and tiles.
1383. T. Ambler, Keighley, Yorkshire—Imp. in top rollers for spinning and drawing frames.

Dated 10th June, 1861.

1472. R. Armstrong, North Woolwich—Imp. in marine steam boilers, parts of which imps. are applicable to other steam boilers, and in apparatus connected therewith.

Dated 11*th June*, 1861.

1490. T. O. Small, Newcastle-upon Tyne—An improved optical instrument for the use of designers and others.

Dated 12*th June*, 1861.

1500. J. A. Dauncer, Bury, Lancashire—Imp. in apparatus for supplying liquid nourishment to infants and invalids, and in the application of such imps. to the feeding of animals.
1506. L. J. J. Pètre, 29, Boulevart St. Martin, Paris—An improved smoke-consuming grate.

Dated 13*th June*, 1861.

1514. C. Swan, College-hill, London—An improved form of travelling bags.
1515. W. E. Gedge, 11, Wellington-street, Strand—Improved beating apparatus for picking and cleaning substances used in making or manufacturing woven or textile fabrics, more especially cashmeres, alpacas, and other fine materials, preparing the same for scouring. (A com.)
1571. H. Holland, Birmingham—An imp. in the manufacture of umbrellas and parasols.
1518. J. Knowles, Bolton-le-Moors, Lancashire—Certain imp. in machinery for preparing cotton and other fibrous materials.
1519. E. Bing, Ramsgate—Imp. in the construction and fittings of sliding window sashes.
1520. J. Illingworth, Bradford—Imp. in arranging sizing houses, brewhouses, dye houses, and other houses and chambers to facilitate the removal of steam set free therein, also in the construction of troughs for sizing cotton warps, and in boxes or other receivers for holding such sized cotton warps.
1521. F. Gregory, Manchester—Imp. in machinery or apparatus for cutting hay and chaff or other similar purposes.
1522. S. Cook and W. H. Hacking, Bury, Lancashire—Imp. in machinery or apparatus for plaiting or folding woven fabrics.
1523. The Hon. C. Duncombe, Camelford-house, Hereford-street, Park-lane, Middlesex—Imp. in machinery for sawing wood and other substances.
1524. B. Blackburn, 1, York-buildings, Adelphi—Imp. in applying oil or lubricating fluid to locomotive and other axletrees.
1525. T. M. Downing, Handsworth, Staffordshire—Imp. in the manufacture of corks and bungs.
1526. W. Bayliss, Monmore-green, Wolverhampton—Certain imp. in chain-harrows for harrowing land.

Dated 14*th June*, 1861.

1528. J. Summerscales, Keighley, Yorkshire, and M. Mason, Manchester—Imp. in gas singeing apparatus.
1529. J. Leeming, Manchester—Imp. applicable to steam boilers, furnaces, and flues.
1531. P. Langlade, Aubusson (Creuse)—Imp. in the manufacture of tapestry and other weavings.
1532. T. W. Wedlake, Hornchurch, Essex—Imp. in hay-making machines.
1533. G. Leach, Britannia Mills, Leeds—Imp. in implements for tilling and cultivating the soil, and in boilers for supplying steam to engines for driving the same, which latter imps. are applicable to boilers generally, and especially to boilers of traction engines.

Dated 15*th June*, 1861.

1535. R. W. Pitfield, Bolton—Certain imp. in self-acting mules for spinning cotton and other fibrous substances.
1536. T. Knowles and P. Aldred, Manchester, and J. Haworth, Salford—Imp. in machinery or apparatus for raising serrated surfaces on rollers.
1537. S. Barnwell, jun., Coventry—An imp. or imps. in the manufacture of upholsterer's fringes
1538. S. Grant, St. James's-street, Westminster—Imp. in breech-loading fire-arms and fowling pieees.
1539. F. Potts, Lombard-street, Birmingham—Certain imps. in the manufacture of metallic posts for supporting telegraph wires, and which said imps. are also applicable for other purposes.
1540. W. Smith, Little Woolstone, Buckinghamshire—Imp. in machinery for giving motion to ploughs, cultivators, and other agricultural implements.
1541. T. Page, Middle Scotland-yard, Westminster—Means and apparatus for facilitating the working and discharge of ordnance placed below the water level.

Dated 15*th June*, 1861.

1542. H. C. Simpson, Shrewsbury—A new or improved vehicle or car.
1543. T. Gray, 19, Hills-cottages, Union-road, Wandsworth—An improved method of bleaching colored rags and vegetable fibres.
1545. D. R. White, Newcastle-upon-Tyne—Imp. in plummets and gauges for indicating the depth and the height or level of liquids.
1547. T. Mellodew, Oldham, C. W. Kesselmeyer, Manchester, and J. M. Worrall, Salford—Imp. in dyeing and printing velvets, velveteens, and other fabrics with floated threads.
1551. J. Perry, Earle-street East, Marylebone—Imp. in washing machines.

Dated 18*th June*, 1861.

1553. A. R. Le Mire de Normandy, Odin-lodge, King's-road, Clapham-park, Surrey—Imp. in refrigerating the fresh water produced by condensing steam.
1555. J. Miller, Greenwich, Kent, and H. E. Skinner, Wapping-wall, Shadwell, Middlesex—Imp. in rotary engines.
1557. R. Walker, Glasgow—Imp. in propelling vessels.
1559. W. B. Taylor, Balmes-road, London—Imp. in heating by means of lamps, and in imparting heat to vessels and their contents, also applicable to cooking and to other purposes.
1561. S. Shaw, Birmingham—Certain imp. in printing machines and in apparatus for taking off and delivering the sheets when printed, and which said apparatus is applicable to the printing machines now in use.
1563. J. Dunn, Preston—Imp. in machinery or apparatus for slubbing, roving, twisting, and doubling cotton and other fibrous substances.
1567. W. E. Newton, 66, Chancery-lane—Imp. in electro-magnetic engines. (A com.)
1569. J. E. Kirby, Banbury—Imp. in steam engines and machinery for giving motion to agricultural implements and other machines.
1571. T. T. Jopling, Sunderland—Imp. in machinery for the manufacture of bolts, spikes, screw-blanks and rivets.

Dated 19*th June*, 1861.

1573. C. E. Butler, Birmingham—An imp. or imps. in the manufacture of riddles or sieves.
1575. J. Fisken, 17, Wharf-road, City-road—Glazing or calendering by steam, horse, or water power textile fabrics which have been worn, made up for use, or sewn together.
1577. P. Pradel, 4, South-street, Finsbury—An improved clasp or fastener.
1579. G. T. Bousfield, Loughborough-park, Brixton—Imp. in brakes for railroad cars. (A com.)
1581. W. J. Harris, Liverpool—Imp. in dry gas meters. (A com.)

Dated 20*th June*, 1861.

1583. L. Hannart, Brussels—An imp. in the manufacture of gloves.
1585. C. Stevens, 31, Charing-cross—Imp. in spiral springs. (A com.)
1587. H. Lawford, 31, Berners-street—Imp. in folding chairs, folding beds, folding arm chair beds, folding couch beds, and other articles for sitting, reclining, and lying upon.
1589. W. E. Gedge, 11, Wellington-street, Strand—Improved means or apparatus for drying, sifting, and cleansing grain and other agricultural produce. (A com.)
1591. R. A. Brooman, 166, Fleet-street—Imp. in pianofortes, parts of which imps. are applicable to other musical instruments, and to apparatuses worked by pedals. (A com.)
1593. C. Hodgson, Ballard Rathdrum, Wicklow—An improved method of partially drying peat before removing the same from the bog.
1595. W. E. Marsily, Antwerp—Imp. in velocipedes.

PATENTS SEALED.

[*From Gazette, June* 28*th*, 1861.]

June 28*th*.
3186. W. Clark.
3189. H. W. Viner.
3191. G. Davies.
5. P. Campbell and T. A. Kendal.
6. W. Cooke.
9. W. Morgan.
10. J. Taylor and M. B. Cooper.
22. P. Pimont.
29. J. Watson and C. F. Halle.
30. H. Gilbee.
40. W. Luck.
85. W. G. Woodcock.
88. W. Bullough.
151. H. Vandercruyce.
199. E. T. Hughes.
619. J. Cimeg.
719. J. Victor and J. Polglase.
721. W. Clark.
819. W. Crighton and F. W. Crighton.
820. M. H. Blanchard.
839. D. Brown, N. Fellows, E. Jones, and W. Brown.
890. W. Bury.

[*From Gazette, July* 2*nd*, 1861.]

July 2*nd*.
28. P. Courtais and F. Jammet.
33. J. Sugden, J. Midgley, and W. Clapham.
114. R. Wilson.
138. J. R. Joy.
259. J. H. Johnson.
551. A. V. Newton.
553. W. Kay and I. Kay.
978. J. Whitehouse.
1185. T. L. Jackson.
1245. A. T. Watson.

PATENTS ON WHICH THE STAMP DUTY OF £50 HAS BEEN PAID.

[*From Gazette, June* 28*th*, 1861.]

June 25*th*.
1665. H. J. Giffard.

[*From Gazette, July* 2*nd*, 1861.]

June 27*th*.
1454. J. Morgan.
June 28*th*.
1463. J. Shaw.
1464. J. Shaw.
June 29*th*.
1481. H. W. Wimshurst.

PATENTS ON WHICH THE STAMP DUTY OF £100 HAS BEEN PAID.

[*From Gazette, July* 2*nd*, 1861.]

June 27*th*.
1429. T. Markland.
June 29*th*.
1431. E. J. Hughes.